Cross-Border Tax Evasion After the Common Reporting Standard: Game Over?[☆]

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Abstract

In 2013, the Automatic Exchange of Information (AEOI) was endorsed as the prevailing universal solution to fight cross-border tax evasion and the OECD launched a global standard for the AEOI, the Common Reporting Standard (CRS). In this study, we analyze the impact of the CRS on cross-border tax evasion. Our results suggest that the CRS induced a reduction of 14% in cross-border deposits parked in traditional offshore countries for tax evasion purposes. Moreover, regardless of the 2,600 bilateral exchange relations created under the CRS, relocation still emerged as the preferred option. More specifically, upon the CRS implementation at domestic level,

[☆]We thank Aparna Mathur, Jannis Bischof, Lisa De Simone, Niels Johannesen, Kiridaran Kanagaretnam, Sebastian Siegloch, Conrad Stahl, Maximilian Todtenhaupt, Johannes Voget and the audience at the Mannheim Taxation (MaTax) Science Campus Meeting (December 2017), at the Belgian Financial Research Forum (June 2018), at the fifth MaTax Conference (October 2018), at the 111th NTA Annual Congress (November 2018) and International Tax Cooperation Conference at the Oxford Saïd Business School (December 2018) for their valuable suggestions and comments. We gratefully acknowledge the financial support from the German Research Foundation sponsored Graduate School of Economic and Social Sciences of the University of Mannheim and the Leibniz Science Campus MaTax.

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January 9, 2019

the United States, which so far did not commit to the CRS, seems to emerge as a potentially attractive location for cross-border tax evasion.

Keywords: Tax Evasion, Automatic Exchange of Information, Offshore Countries, Cross-Border Deposits.
JEL: F42, G21, H26, H31

1. Introduction

In the last decades, capital mobility increased substantially thanks to globalization and rapid technological development. This provides individuals several channels to transfer their wealth and related income to jurisdictions offering very attractive tax systems together with a sound level of bank secrecy, i.e. the so-called offshore countries. Recent estimates by Zucman (2013) suggest that at least 8% of global household financial wealth is located in offshore countries, translating into around 7.6 trillion dollars. In the past ten years a total increase of offshore wealth by 25% has been documented.

Cross-border tax evasion, however, deprives jurisdictions around the world from substantial tax revenue every year. For example, statistics from the Internal Revenue Service (IRS) state that the U.S. government loses annually around USD 100 billion in tax revenues due to domestically unreported wealth and related income parked in offshore countries.[2] It is general consensus at OECD level that cross-border tax evasion can be fought most effectively by further increasing the information exchange between countries. Back in 2010, the U.S. were the first to act, by implementing the Foreign Account Tax Compliance Act (FATCA), a system forcing foreign financial institutions to collect and transfer financial account information on U.S. citizens to the IRS. OECD member states started being interested in requesting similar financial information on their own residents. In this way, the introduction of FATCA pushed an international discussion at the OECD level on developing a global standard for the Automatic Exchange of Information (AEOI) (Christensen III and Tirard (2016)). The debate culminated in early 2013 with a formal request to the OECD by the G20 to design a prototype for a universal system for the AEOI. On 21 July 2014, the OECD published the

[2]For more detail, see https://www.irs.gov/businesses/small-businesses-self-employed/abusive-offshore-tax-avoidance-schemes-talking-points, accessed on 18.12.2018.

final version of it, the so-called Common Reporting Standard (CRS) (OECD (2018c)).

Thanks to its multilateral approach, broad scope and extensive country coverage, the CRS is substantially different from any initiative in the field of information exchange launched so far, including its own role model FATCA. This is why it should induce a true revolution in the level of scrutiny on wealth and related income parked in offshore countries and substantially change the dynamics of cross-border tax evasion. Yet, the effectiveness of the CRS has not been thoroughly investigated. The aim of this paper is to close this gap.

In the related literature, it is unanimously reported that the implementation of previous information exchange agreements, such as bilateral treaties, does not reduce tax evasion overall but rather induces a relocation of wealth from collaborative offshore countries, i.e. those who signed such an agreement, to non-collaborative ones (Johannesen and Zucman (2014); Johannesen (2014); Hanlon et al. (2015); Caruana-Galizia and Caruana-Galizia (2016); Omartian (2017); De Simone et al. (2018)). However, compared to these earlier initiatives, the CRS achieves an impressive country coverage. At present, more than 100 jurisdictions worldwide have committed to the CRS.[3] In particular, most of the so-called tax havens are included in the list of participating jurisdictions implying a substantial change in bank secrecy. Recent estimates by Deutsche Bank & Oliver Wyman (June 2017) (p.25) suggest USD 1.1 trillion in outflows from offshore accounts by the end of 2017 as a reaction to the CRS implementation in early adopters.

In this study, we initially test whether the CRS implementation into national law induced a drop in cross-border tax evasion through well-known sites for hiding wealth and related income, i.e. traditional offshore countries. Next to these out movements, we investigate relocation of deposits towards an unexpected new location. Anecdotal evidence suggests that, although not typically classified as a low tax country, in the post CRS world, the U.S. may be a very attractive destination for hiding wealth and related income for tax evasion purposes. This claim may seem surprising at first, because they do not generally offer a tax system as attractive as that of traditional offshore countries. Nevertheless, the U.S. are the only major financial center that remains not committed to the CRS and they offer a high degree of bank secrecy (Cotorceanu (2015)) together with advantageous tax-free facilities for

[3]For a complete list, see OECD (2018a).

non-resident individuals (Brunson (2014)). Thus, we proceed by investigating whether after implementation of the CRS tax evaders reallocate their deposits to the U.S..

Following the related literature (Huizinga and Nicodème (2004), Zucman (2013), Johannesen and Zucman (2014), Menkhoff and Miethe (2017) and Alstadsæter et al. (2018)), we consider the outstanding volume of cross-border deposits placed in offshore countries as measure of cross-border tax evasion. The data we use originates from the Bank for International Settlements (BIS), which provides comprehensive disaggregated quarterly data on deposits held by individuals and entities that are not residents of the country where the reporting bank is located (i.e. cross-border deposits). We supplement this dataset by hand collecting the exact introduction and effectiveness dates for the CRS for all countries in our sample.

We estimate tax evaders reaction to this unprecedented global initiative for the AEOI by using a difference-in-difference design. To test whether the CRS led to a decline in deposits held in offshore countries, we compare the change in cross-border deposits held in offshore countries (treated group) to the change in cross-border deposits held in non-offshore countries (control group) after CRS implementation. Second, we test whether relocation of cross-border deposits to the U.S. occurred by estimating the change in cross-border deposits in the U.S. (treated group) as compared to the change in cross-border deposits in other non-offshore countries (control group) after the CRS implementation. By employing the country-level implementation of the CRS as exogenous shocks, our model absorbs all time-invariant factors that shift cross-border deposits across countries. We control for between country-pair differences by adding ordered country-pair fixed effects, and for (demand) shocks in the residence country, by adding residence country-year-quarter fixed effects. Thus, we investigate the CRS's effects on a within residence country-quarter and country-pair level. We do not expect that anticipation plays a major role, since it is both possible and sensible for tax evaders to wait until the last moment before moving deposits out of offshore countries.

We find that upon the CRS implementation at national level cross-border deposits held in offshore countries decrease on average by 14% to 36% compared to non-offshore countries. With event studies, we show that this is due to a statistically significant immediate decline of cross boarder deposits held in offshore countries in reaction to the CRS. In our tests on relocation behavior, we find that after CRS implementation cross-border deposits held in the

U.S. are on average 9% higher compared to in other non-offshore countries. What's more, in an event study we show that the increase of cross-border deposits in the U.S. after the implementation of the CRS is both immediate and persistent over the whole post treatment period.

Our results are of great relevance to governments of CRS participating jurisdictions. To the best of our knowledge, we are the first to isolate the impact of the CRS and to offer evidence on which jurisdiction(s) emerge as preferred destination for cross-border tax evasion as a consequence of the CRS implementation.[4] Tax evaders still seem to deem reallocation a convenient option, but a new destination appears as very attractive for deposit holders, namely the U.S.. This represents a politically relevant result. Our study highlights one critical aspect that could have the potential to maximize the benefits of a global standard for the AEOI, namely the U.S. participation in the CRS project. Nevertheless we are aware that other aspects might need improvement as well. For example at present the usability of the information collected under the CRS is far from certain (Finèr and Tokola (2017)) and the possibility to exploit the category non-reportable financial institutions represents a way to circumnavigate CRS reporting requirements (e.g. as in the case of the Occupational Retirement Scheme in Hong Kong). Still the currently locally implemented CRS model will be revised by the OECD by the end of 2018 so as to address potentially existing loopholes.

The rest of the paper is organized as follows. In section 2, we offer an overview of the related literature and develop our hypothesis. In Section 3, we describe our research design. Section 4 presents graphical evidence on the development of cross-border deposits in our sample. Section 5 contains the core of our paper, where we provide key results of our study in detail. Section 6 offers additional tests on the effect of the CRS on indirect channels of tax evasion. In Section 7, we summarize our findings.

2. Tax Evasion and Countermeasures

Tax evasion represents a pervasive phenomenon. Current statistics from the European Commission suggest an estimated yearly tax gap of around

[4]Next to relocation, another option for tax evaders is to repatriate their deposits after CRS implementation. Due to a lack of high quality data, however, we do not study directly to what extend repatriation occurred.

EUR 1 trillion within the EU alone,[5] whereas the U.S. provides estimates of an annual average tax revenue loss of USD 458 billion in the U.S. due to non-compliant tax behavior.[6] While partially caused by unreported income held locally, a substantial portion is caused by unreported income held abroad. Zucman (2013) estimates that around 8% of worldwide household wealth is located in tax havens. More recently, Alstadsæter et al. (2018) show that this estimate varies significantly across the world. 60% of the wealth in tax havens is held in the Gulf and certain Latin American countries, while only 15% in continental Europe and even less in Scandinavia. Yet, regardless of the geographical dispersion, the ownership of this hidden wealth strongly concentrates in the top 0.01% of the wealth distribution (Alstadsæter et al. (2017)).

As early as 1972, Allingham and Sandmo (1972) demonstrated that the individual level of evasion is a function of incentivizing and deterring factors, one deterrent being the probability of facing increased tax audits (Slemrod (2018) provides an overview of tax enforcement tools). The prevailing policy tool to increase the threat of detection in the context of cross-border tax evasion is the information exchange across jurisdictions (Dharmapala (2016) and Bott et al. (2017)). Since more than a century, countries cooperate with each other on tax matters using information exchange agreements. 1998 is one of the most crucial years on the route towards international tax transparency. In that year, the OECD issued its well-known report on harmful tax competition, which led few years later to the development of a comprehensive model for tax information exchange agreements (TIEA) (Christensen III and Tirard (2016)). There is a large empirical literature on the impact of early initiatives in the field of information exchange. To begin with, Huizinga and Nicodème (2004) focus on the effect of bilateral tax information exchange agreements (TIEAs) among OECD member states from 1999 and find that the existence of exchange relationships across countries does not seem to diminish external liability flows. They attribute the result to the inefficiency of the TIEA network, in particular the limited country coverage and the insufficient quality of the exchanged data. The network of TIEAs extended

[5]For more details, see http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//NONSGML+REPORT+A8-2017-0357+0+DOC+PDF+V0//EN, accessed on 18.12.2018.

[6]For more detail, see https://www.irs.gov/newsroom/the-tax-gap, accessed on 18.12.2018.

considerably between 2009 and 2011, when, thanks to international pressure, several tax havens started signing agreements with non-tax havens (Bilicka and Fuest (2014)). Johannesen and Zucman (2014) consider this first wave of TIEA introductions and analyze its effectiveness in fighting cross-border tax evasion. They find that the introduction of TIEAs reduces the level of wealth and related income parked in offshore countries, but they also document relocation behavior to non-collaborative tax havens. When considering the long-term impact of TIEAs, a diminishing effect starting from 2010 is documented (Menkhoff and Miethe (2017)).

The first step towards a multilateral approach to exchange of information occurred in 2003 when the European Council (2003/48/EU) (commonly known as Savings Directive) was issued, forcing the automatic exchange of information on private saving income among EU member states. Still empirical evidence suggests that no overall reduction in cross-border tax evasion was achieved, but that tax evaders relocated their deposits to non-EU offshore countries (Johannesen (2014), Caruana-Galizia and Caruana-Galizia (2016) and Omartian (2017)). The U.S. instrument FATCA is found to have induced similar relocation effects (De Simone et al. (2018) and Omartian (2017)).

However, the CRS is different from these previous initiatives in the field of information exchange.[7] First, it constitutes a multilateral approach similar to the EU Savings Directive, but different from bilateral approaches such as FATCA and classical TIEAs. This is because the CRS eliminates the requirement to negotiate single treaties on a country-by-country basis. To date 104 jurisdictions around the world signed the multilateral agreement, meaning they commit to exchange of information under the CRS requirements in the near future (see OECD (2018b)). Secondly, participating jurisdictions automatically exchange information with any other participating counterparty. In this way, in contrast to normal TIEAs and FATCA, the information is no longer exchanged only upon request. Thirdly, the CRS not only has a larger country coverage than any previous initiative but also a wider scope. Reportable financial institutions are forced to provide detailed information on financial assets held by non-resident taxpayers, which is not limited to interest income and covers deposits held by individuals as well as entities. Thus, a true revolution in the fight against cross-border tax evasion should

[7]For a comprehensive overview of the CRS and its implementation at national level, see Casi et al. (2018).

be expected. Consequently, our first test focuses on the CRS's effectiveness in reducing wealth and related income parked in traditional offshore countries to avoid tax obligations at home.

In the second and main part of the analysis, we test to what extent and to which countries deposits are shifted to, given that those traditionally considered attractive for hiding wealth and related income now automatically exchange financial account information. The U.S. are the only important financial center around the world, which did not commit to the CRS and does not plan to do so in the near future (Goulder (2019), p. 139).[8] When compared to the CRS, the information transmitted under FATCA is limited making the U.S. more attractive as compared to offshore countries that participate in the CRS (Hakelberg and Schaub (2018), pp. 356-357). Under FATCA, the IRS transmits data on foreign financial account holders only upon request and only if such request comes from countries, which singed the FATCA Model 1a Intergovernmental Agreement (IGA). The transmitted information is further limited to the gross interest paid for depository accounts, only if held by an individual, and U.S. source interests and dividends for custodial accounts, only if the accounts are already subject to reporting and only with respect to individuals and entities in partner jurisdictions. No information on the last beneficial owners of passive non-financial entities (NFEs) is collected and transmitted to IGA partners (Cotorceanu (2015), p. 1053). Country evidence even suggests that the U.S. duty to exchange information based on FATCA agreements is not fully respected.[9] Next to limited information exchange, non-resident individuals investing in the U.S. enjoy advantageous tax-free facilities. This includes tax exemption on domestic-source portfolio interest or reinvested dividends (Brunson (2014)). Further, the U.S. provides high levels of bank secrecy.[10] Currently no U.S. state or federal law obliges legal entities to maintain beneficial ownership information or

[8] Other than the U.S., non-CRS-abiding countries generally cannot provide an attractive and stable financial sector and are not OECD and EU member states. Countries not committed to CRS so far include Algeria, Armenia, Bangladesh, Egypt, Maldives, Oman, Palestine, Philippines, Sri Lanka, Thailand, Turkish Republic of Northern Cyprus, U.S. and Vietnam. See http://www.crs.hsbc.com/, accessed on 18.12.2018.

[9] For more details, see Sueddeutsche Zeitung (2018)

[10] According to the Financial Secrecy Index from the Tax Justice Network, the U.S. positioned itself as second in the 2018 ranks, gaining four positions from the one in 2013, see https://www.financialsecrecyindex.com/, accessed on 18.12.2018.

even requests legal entities to disclose beneficial owners identity when they are established.[11] Last, on grounds of an extensive cross-country randomized field experiment, Sharman (2010) and Findley et al. (2015) find that in contrast to non-U.S. providers, U.S. service providers for shell company incorporation are actually less likely to comply with international transparency standards. This reduces the complexity of setting up a shell company in the U.S. (Findley et al. (2015), p.153, 157).[12] Thus, although not typically classified as a low tax country, in the post CRS world, the U.S. may be very attractive for hiding wealth and related income.[13]

3. Research Design

3.1. Data

Our main dataset is constructed based on the BIS Locational Banking Statistics (LBS). It offers detailed information about the outstanding volume of claims and liabilities of internationally active banks located in reporting countries vis-a-vis counterparties residing in more than 200 jurisdictions around the world. For the purpose of our analysis, we focus on the outstanding quarterly volume of cross-border deposits (in the following revert to as cross-border deposits). The data enables us, for example, to observe the total amount of deposits German residents owned in active banks located in Hong Kong. In our empirical analysis, we include all offshore countries, for which data at bilateral level is publicly available in the BIS dataset, i.e. Guernsey, Hong Kong, Isle of Man, Jersey and Macau.[14] We want to avoid including

[11] In May 2016, under the bank secrecy act, the Treasurys Financial Crimes Enforcement Network issued a new customer due diligence requirement imposing on certain domestic financial institutions the collection of a beneficial ownership information form for their respective clients corporations and trusts. But the law has not yet being enacted. Even in case of execution, it has been labeled as fully ineffective because among others it allows senior managers of the company to be identified as beneficial owner (see Tax Justice Network (2018)).

[12] Furthermore, only 62 of the answers to the 2,336 inquiries in the United States asked for any document with a photo establishing identity. See Findley et al. (2015), p.157.

[13] For more details, see The Economist (2016) or Bloomberg (2017)

[14] Others, such as Hines Jr and Rice (1994), Johannesen and Zucman (2014) or Johannesen et al. (2018) consider as offshore countries a much larger selection of countries. In Appendix B, we test the exact same sample of offshore country as the one of Johannesen et al. (2018) and our results remain unchanged.

countries that are extensively exploited for corporate tax avoidance purposes, since the primary target of the CRS is individual tax evasion. Thus, we focus on a subset of offshore countries for which the chance of holding a local deposit for reasons beyond individual tax evasion is minimal. As location of the owner of the deposits, we select all EU and OECD member states arriving at a total of 41 countries.[15] Our sample period ranges from the last quarter of 2014[16] to the third quarter of 2017. In this way, we exclude possible confounding impacts of the big wave of bilateral TIEAs signatures in 2008-2011, the introduction of FATCA in 2010-2013 as well as the US tax reform in December 2017.[17] Table 1 provides a comprehensive list of the countries considered in our analysis, divided by the status of CRS implementation. Where first wave adopters denotes those countries that request the collection of financial information starting from January 1 2016 and exchange the financial information in 2017 for the first time.

The main advantage of the data is the extensive country coverage. The coverage rates on cross-border interbank business is around 95%.[18] Additionally, the BIS data features sectoral decomposition into bank and non-bank sector. As highlighted also in Johannesen and Zucman (2014), interbank deposits should not represent a channel for tax evasion. This is why we consider only non-bank deposits.

The limitations of the data are as follows. First, we can only observe the immediate owner and not the final beneficiary of a deposit. Given the well-established evidence of the use of shell companies,[19] we therefore address the role of shell companies in additional tests in Section 5. Second, the BIS statistics do not distinguish between individual and entity ownership of deposits. However, we do not see this as a limitation to our analysis. The CRS requires

[15] We consider EU and OECD member states as of June 2018.

[16] We start from the last quarter of 2014 because data for Hong Kong are available only from that date on.

[17] The only possibly confounding event during the selected period of time is the implementation of Basel III between 2013 and 2015 and of the fourth EU Directive on prevention of the use of the financial system for the purposes of money laundering or terrorist financing issued in May 2015 (European Parliament and Council (2015/849/EU)). However, those reforms are not directly influencing the movement of cross-border deposits for the purpose of tax evasion.

[18] For an overview on the BIS data, see BIS (2017).

[19] Johannesen and Zucman (2014) (p.85) states that the owners of 25% of all deposits in tax havens are recorded as resident of other havens.

Table 1: CRS Implementation Overview on a Country-by-Country Basis

1st Wave (info exchanged in 2017 for the first time)		**2nd Wave (info exchanged in 2018 for the first time)**	
Austria	Italy	Australia	Japan
Belgium	Jersey	Brazil	Macau
Bulgaria	Republic of Korea	Canada	New Zealand
Croatia	Luxembourg	Chile	Switzerland
Cyprus	Mexico	Hong Kong	Turkey
Czech Republic	Netherlands	Israel	
Denmark	Romania		
France	Poland	**Only committed to the CRS**	
Germany	Slovak Republic	Chinese Taipei	
Guernsey	Slovenia	Philippines	
Greece	Spain		
Hungary	South Africa	**Not committed to the CRS**	
Ireland	Sweden	United States	
Isle of Man	United Kingdom		

financial institutions to collect information on both individual and entity accounts. In case of the latter, financial institutions are required to conduct an accurate investigation regarding the final individual owner of the financial account. This means that upon CRS implementation, we do expect a reaction from both if entity owned accounts are used for tax evasion purposes. Lastly, since the BIS statistics includes only deposits, alternative channels for tax evasion, namely equity or bond portfolios, are excluded from our analysis. Yet, as suggested by Johannesen and Zucman (2014) (p.72), bank deposits can be considered a sound proxy for testing the reaction to a shock in the scrutiny on wealth in offshore countries.[20]

Table 2 provides descriptive statistics on all cross-border deposits held in offshore countries on which the BIS provides data and on the U.S.. The time

[20]Heckemeyer and Hemmerich (2018) (p.3) show that the reaction to increased information exchange on portfolio wealth held through tax haven jurisdictions mirrors the reaction on cross-border deposits held in tax havens that is observed by Johannesen and Zucman (2014). Suggesting that our estimates on the effect of the CRS on cross-border deposits may similarly apply to the other channels for tax evasion.

period covered is from 2014 until 2017. The U.S. has the largest average, minimum and maximum amount of deposits in absolute terms, followed by Hong Kong and Jersey. The small islands of Guernsey, Jersey and Isle of Man still represent important countries for cross-border deposits. This may be due to the fact that most of the deposits considered in our sample are owned by residents of EU member states, who may consider geographical proximity useful to hiding wealth and related income.

Table 2: Descriptive Statistics on Offshore Countries & U.S. (2014-2017)

Deposit Country	Observations	Mean (M $)	Stand. Deviation (M $)	Min (M $)	Max (M $)
GG	486	411.7	1,370.8	0.0	8,366.3
JE	492	802.8	3,391.1	1.0	23951.0
IM	491	438.1	1,840.5	0.6	13,415.6
HK	492	1,347.3	2,809.3	2.5	17,371.3
MO	412	140.5	509.3	0.0	4,515.8
US	480	14,858.2	52,945.8	6.0	37,3090.0

Notes: The table depicts the quarterly cross-border deposits held by OECD and EU residents in the available offshore countries and U.S. for our sample period, which starts in the last quarter of 2014 and runs until the third quarter of 2017. The data is taken from the BIS. GG stands for Guernsey. IM stands for Isle of Man. JE stands for Jersey. US stands for the U.S. as deposit country.

We manually collect information on both the exact CRS introduction date and the exact CRS effective date at country level by directly considering national laws. The OECD provides on its website the link to each CRS national law for both the first and second wave adopters.[21] When the information is not available through the OECD database, we search it using news alerts from the Customer and Investor Tax Transparency (CITT) News Blog by PwC.[22] As control variable, we collect data on country financial secrecy levels using the 2018 Financial Secrecy Index of the Tax Justice Network. The most secret locations have the highest secrecy scores in the index.

[21]See OECD "Automatic Exchange Portal CRS by Jurisdiction", available at http://www.oecd.org/tax/automatic-exchange/crs-implementation-and-assistance/crs-by-jurisdiction/, accessed on 18.12.2018.

[22]For more details, see https://blogs.pwc.de/citt/, accessed on 18.12.2018.

3.2. Empirical Strategy

We first test whether cross-border deposits held directly in offshore countries are reduced due to the local implementation of the CRS. Given that traditional offshore countries are all CRS compliant,[23] we compare changes in cross-border deposits held in offshore countries with those held in non-offshore countries. In this way, our control versus treatment group follows Hanlon et al. (2015).[24] Precisely, in our difference-in-difference design we compare the change in deposits held in offshore countries by residents of EU and OECD member states (treatment group), to the change in deposits in non-offshore countries by residents of EU and OECD member states (control group) after CRS implementation (post period). The function of the control group is to absorb common changes in cross-border deposits unrelated to the CRS, such as recessions or booms. We do not expect any significant reaction to the CRS in our control group because changes of cross-border deposits in non-offshore countries should mainly be driven by economic activity, which we reasonably expect to be unaffected by the CRS. We run regressions of the form:

$$\begin{aligned} log(Deposits_{ijt}) = \alpha &+ \beta_1 PostCRSIntroDepL_{jt} \\ &+ \beta_2 PostCRSIntroDepL_{jt} * Offsh_j \\ &+ \gamma_{it} + \theta_{ij} + \epsilon_{ijt} \end{aligned} \tag{1}$$

Where the dependent variable $log(Deposits_{ijt})$ stands for (log) volume of deposits of residents of country i in banks at deposit country j at the end of quarter t. $Offsh_j$ is a dummy taking value one when the deposit country is an offshore country. It constitutes the treatment dummy.[25] $PostCRSIntroDepL_{jt}$ is the post period dummy we are interested in. It switches on after CRS implementation and stays switched on until the end of the sample period. Following

[23] Macau is committed to the CRS, i.e. agreed to introduce the CRS into national law but so far did not enact the CRS law locally. In May 2017, a new regulation updating Macau exchange of information framework has been issued and in May 2018, Macau signed the MCAA. Thus Macau is on its way to introduce the CRS nationally soon.

[24] However, the authors use a dependent variable, i.e. the measure of cross-border tax evasion, which differs from the one we use in our research design (see Hanlon et al. (2015), p.265).

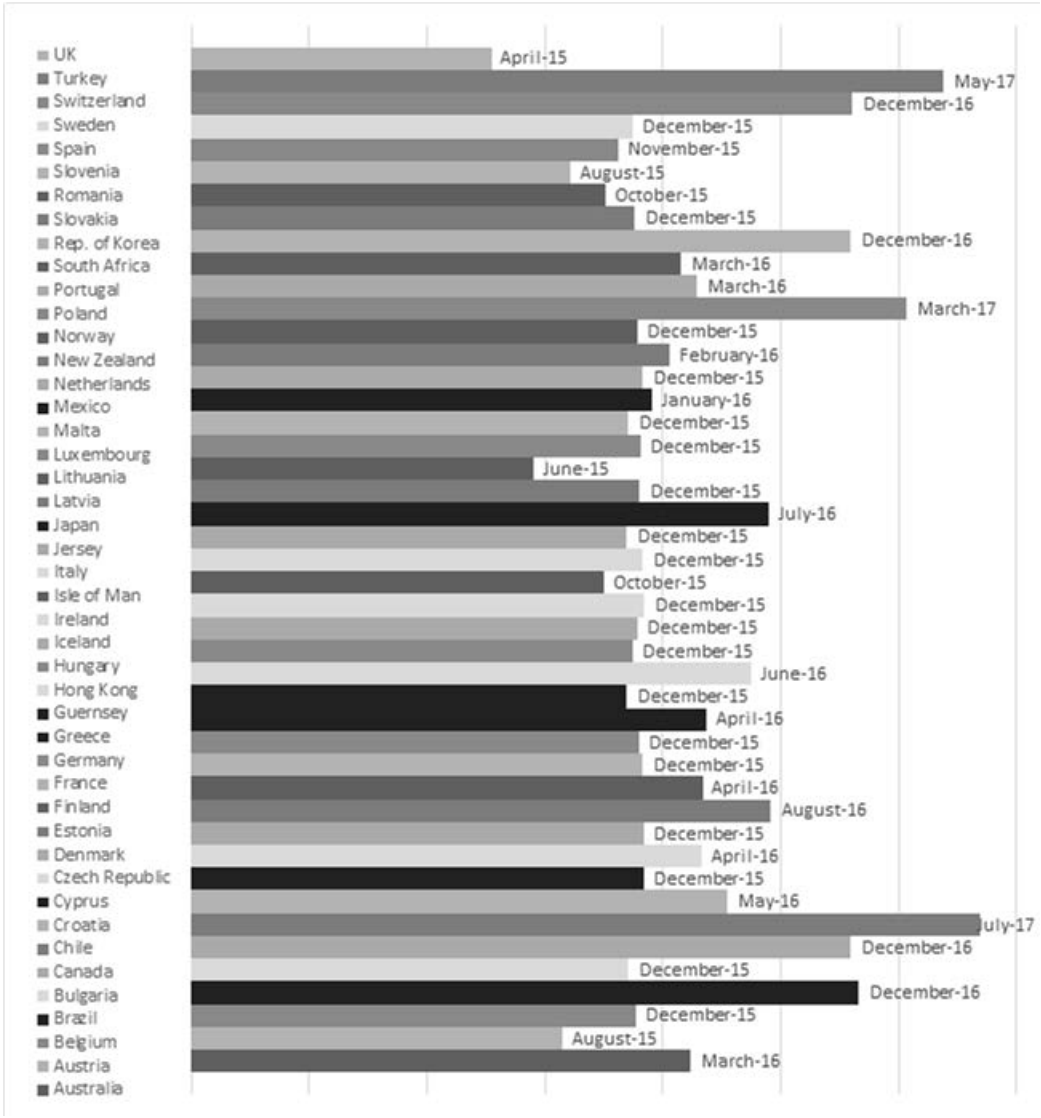
[25] Since the treatment dummy is perfectly multicollinear with our country-pair fixed effects we do not include it as non-interacted term.

the related literature, we chose the introduction date (i.e. the publication of the law into the official gazette) as post period for our baseline instead of the effective date of the CRS (i.e. the day when financial institutions have to start collecting information under CRS) because we expect that in anticipation of CRS effectiveness tax evaders want to reduce their deposits held in offshore countries already at the introduction of the CRS into national laws. As already highlighted, the CRS is not introduced everywhere at the same time. In fact, there is considerable variation in the introduction dates across residence and deposit countries as can be seen in Figure 1, which we can exploit for identification.

We include ordered country-pair and residence country-year-quarter fixed effects. The residence country-year-quarter fixed effects allow us to further control for common time trends affecting cross-border deposits such as globalization of financial markets and economic shocks, but also residence country specific demand side shocks. The ordered country-pair fixed effects allow us to control for all time invariant country-pair factors such as distance or common language, which might affect the change in cross-border deposits as a reaction to the CRS. Overall, we employ the most comprehensive fixed effects structure that our data allows.[26] Our standard errors are cluster robust, with clustering at the ordered country-pair level. Identifying variation stems from the within ordered country-pair and residence country-time changes in cross-border deposits after the CRS introduction, where we compare changes in OECD and EU residents' deposits in offshore countries to changes in OECD and EU residents' deposits in non-offshore countries. We expect that deposits if held for tax evasion purposes in offshore countries are on average reduced relative to the deposits in non-offshore countries after the CRS introduction. We claim that the reaction by tax evaders occurs at the offshore countries rather than in the country of their residence, because offshore deposits are not immediately affected, if the CRS is only introduced in the residence countries. We test our claim in an additional regression reported in section 5.2.5.

With a second, alternative design choice, we rule out that our results are driven by concurrent events systematically related to the CRS implementation at the individual country level. Although we do not find any such

[26]For example, Johannesen and Zucman (2014) use country-pair and quarter-year fixed effects in their similar research design.



Notes: The figure displays the exact date of CRS implementation into national law in all countries considered for the purpose of this study, excluding those that either did not introduce the CRS yet or are not committed to it (i.e. Chinese Taipei, Israel, Macau, Philippines and the U.S.).

Figure 1: CRS Implementation into National Law Exact Date

events, the CRS introduction dates could be correlated with other factors affecting cross-border tax evasion, such as other measures that were simultaneously taken in the offshore deposit countries. Therefore, in an alternative specification, we use a post period dummy (PostCRSFirstWave) that is con-

stant across all observations and not directly related to the country-specific CRS implementation. The post period we chose is the period starting in the first quarter of 2016, i.e. the time when financial intuitions of the first wave adopters started collecting information for CRS purposes. We run a new regression of the form:

$$\begin{aligned} log(Deposits_{ijt}) = \alpha + \beta_1 PostCRSFirstWave_t * Offsh_j \\ + \gamma_{it} + \theta_{ij} + \epsilon_{ijt} \end{aligned} \tag{2}$$

All variables and specifications of the fixed effects remain the same as in equation 1, except for the treatment dummy $PostCRSFirstWave_t$, a dummy equal to one starting in January 1, 2016 - the period of the first wave of information collection for the CRS - and zero otherwise. Thus in this regression, we compare the change in the volume of foreign deposits in offshore countries after the CRS is effective in the first wave adopters to the change in the volume of deposits in the control group countries (mainly EU and OECD countries). Finally, in a robustness check, we test country-specific CRS effective dates.

In the second part of our analysis, we test for changes in cross-border deposits located in the U.S. after versus before the CRS effectiveness. Thus, we add to our baseline estimations from above an interaction term that indicates the change in cross-border deposits non-residents hold in the U.S. after CRS implementation. We run new regressions of the form:

$$\begin{aligned} log(Deposits_{ijt}) = \alpha + \beta_1 PostCRSFirstWave_t * Offsh_j \\ + \beta_1 PostCRSFirstWave_t * US \\ + \gamma_{it} + \theta_{ij} + \epsilon_{ijt} \end{aligned} \tag{3}$$

Model 3 corresponds one-to-one to model 2, except for the added interaction term of the $PostCRSFirstWave_t$-dummy and the US_j-dummy. That interaction captures the treatment effect of the CRS on foreign deposits held in the U.S.. US_j is a dummy equal to one for the U.S. as deposit country and zero for the remaining deposit countries. Thus, while controlling for the effect of the CRS in offshore countries, we compare the change in deposits held in the U.S. to the change in deposits held in other non-offshore jurisdictions after the implementation of the CRS. The fixed effects identify the change within the country-pair and residence-quarter-year. The implementation of

the CRS is measured using the non-staggered treatment dummy, which is only time and not country dependent and switching to one when the CRS is effective in the first wave adopters. β_2 is the coefficient of interest. We expect a positive coefficient for β_2 as wealth and related income are relocated to the U.S.. Rather than identifying, as in our baseline analysis, the effect based on the introduction of the CRS at the individual country level, we chose to base this test on the non-staggered specification of the CRS treatment period because in the U.S we do not have an implementation date at the level of the deposit location.

4. Preliminary Evidence

Table 3: Deposits Changes Before and After the CRS (2010-2017)

Sample	Observations	Mean (M$)	St. Dev. (M$)	Min (M$)	Max (M$)
OF, before CRS	3,144	855	3011	0	30,917
OF, after CRS	1,386	599	2162	0	22,614
US, before CRS	879	13,282	48,994	5	373,090
US, after CRS	280	15,274	52,677	8	359,448
Non-US + Non-OF, before CRS	14,652	3,867	27,276	0	749,655
Non-US + Non-OF, after CRS	5,391	3,374	22,004	0	611,654

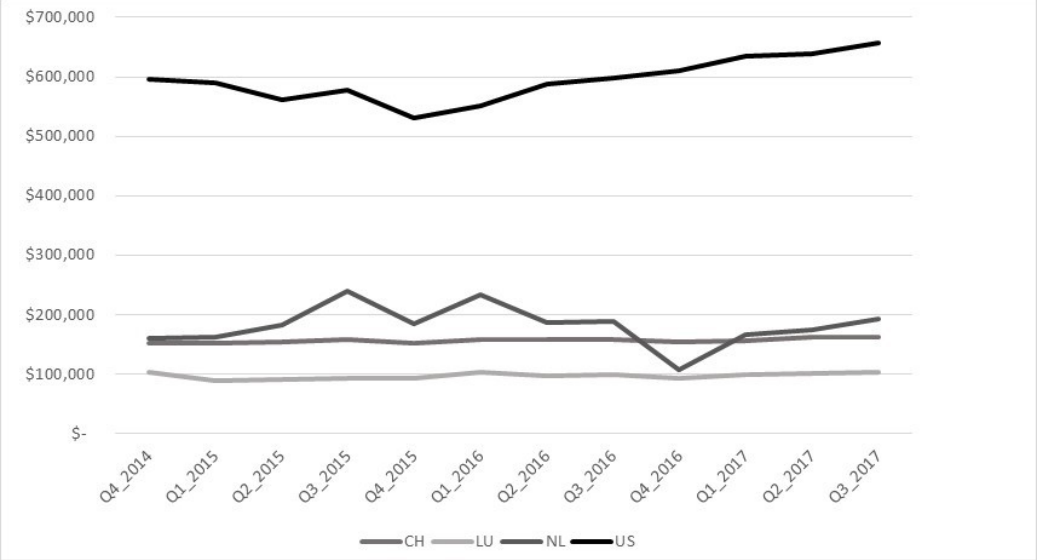
Notes: The table compares where residents of the EU and OECD hold deposits for the period starting in the first quarter of 2010 until the first quarter of 2017. The data is taken from the BIS. OF stands for offshore countries (restricted to Guernsey, Isle of Man and Jersey) as deposit countries. U.S. stands for the U.S. as deposit country. Non-U.S. + Non-OF stands for all other available deposit countries. Before CRS is the period before the first wave of information exchange under the CRS. After CRS is the period after the first wave of information exchange under the CRS.

In our regression analysis, we test the effect of the CRS on money hidden in traditional offshore accounts as well as potential relocation of such hidden money to the U.S. In this section, we provide preliminary evidence in this regard based on aggregate data.

Table 3 provides the mean of cross-border deposits located in offshore countries, the U.S. and other non-offshore countries before and after CRS implementation. Cross-border deposits in offshore countries strongly decrease,

by around 30%, after CRS became effective. In non-offshore countries excluding the U.S. they decrease slightly, by around 13%. In contrast, in the U.S. cross-border deposits increase after CRS effectiveness by 15%. These findings corroborate our evidence that upon CRS implementation wealth and related income parked in offshore countries decline on average while in the U.S. they increase on average.

Second in Figure 2, we find additional corroboration on the relocation effect induced by the implementation of the CRS. The sample period corresponds to the sample period considered in our regression analysis (2014-2017). We compare the evolution of aggregated cross-border deposits held in the U.S. versus those held in Luxembourg, the Netherlands and Switzerland, where the level of bank secrecy is very high.



Notes: The figure charts cross-border deposits held by residents of EU and OECD countries in the U.S. (left axis) and cross-border deposits held by residents of EU and OECD countries in Luxembourg, the Netherlands and Switzerland (right axis) from fourth quarter of 2014 until the third quarter of 2017. We restrict the time period so as to include observations for the Netherlands. The data is from the BIS Table A6.2 and amount are reported in USD.

Figure 2: Deposit Trends in Top Secrecy Locations

While cross-border deposits in the U.S. steadily increase around local CRS implementation between 2015 and 2016, no trend is visible in the other considered locations. The findings in Figure 2 are thus in line with our empirical test results which show that the increase in cross-border deposits in

the U.S. is not due to the general financial secrecy level of the country but rather its non-participation in the CRS.

5. Empirical Results

5.1. Testing the CRS's Effects on Offshore Countries and the U.S.

We report the results from our main test on the effect of the CRS on cross-border tax evasion in Table 4. The results from the estimation of equation 1 and 2, our test of whether the introduction of the CRS leads to a reduction of deposits held in offshore countries, can be found in Columns 1 to 3 of Table 4. Column 1 refers to the post CRS period specified as the CRS introduction measured at country level, Column 2 to CRS effectiveness measured again at country level and Column 3 to the period after the first CRS adoption wave not measured at the country level. Our coefficient of interest is the interaction term of the offshore variable and the respective Post-CRS dummy. The findings confirm our expectation on CRS's effect on cross border tax evasion in traditional offshore countries. We observe a highly significant 14% reduction of cross-border deposits held by residents of the OECD and EU in offshore countries upon the introduction of the CRS as compared to the change in cross-border deposits in the control countries.

This effect is similar yet slightly larger in terms of size to what Johannesen and Zucman (2014) find in their test of the effect of bilateral information exchange on cross-border deposits in tax havens and it is more significant here.[27] On first inspection, the CRS introduction accordingly seems to have a similar effect in a deposit location as a bilateral treaty. However, for at least two reasons this result suggests that the CRS is considerably more effective than previously concluded bilateral treaties. First, the CRS is introduced on top of bilateral treaties in most of our sample country-pairs. Second, our sample mainly includes EU member states where also the Savings Directive was already in place. This is why in Section 5.5.2 below, we run the same regression analysis as above, but we limited our sample to Non-EU member states as countries of residence of tax evaders. As expected, then the effect of the CRS is considerably higher.

We use aggregate BIS data to give an intuition for the economic relevance of the CRS: In a given quarter-year, the average amount of deposits held

[27] Johannesen and Zucman (2014) find an 11% decrease.

TABLE 4: CHANGE IN CROSS-BORDER DEPOSITS UPON CRS INTRODUCTION AND EFFECTIVENESS

CRS SPECIFICATION	(1) Country Introduction	(2) Country Effectiveness	(3) First Adoption Wave	(4) First Adoption Wave	(5) First Adoption Wave
VARIABLES	LogDeposits	LogDeposits	LogDeposits	LogDeposits	LogDeposits
PostCRS * Offsh	-0.140***	-0.145***	-0.231***	-0.226***	-0.240***
	(0.0503)	(0.0498)	(0.0597)	(0.0601)	(0.0652)
PostCRS * US				0.0902*	0.0850*
				(0.0479)	(0.0498)
PostCRS * Secrecy					0.00107
					(0.00218)
Observations	11,472	11,472	11,884	11,884	11,884
R-squared	0.974	0.974	0.972	0.972	0.972
Country-Pair FE	YES	YES	YES	YES	YES
Residence-Quarter-Year FE	YES	YES	YES	YES	YES
Macao in Sample	NO	NO	YES	YES	YES
Number of Countrypairs	1012	1012	1051	1051	1051

Notes: Clustered at the ordered country-pair level. The dependent variable is the log of cross-border deposits held by residents of country i in banks of deposit location j in the end of quarter q. The unit of observation is the residence and deposits ordered country-pair and the sample period goes from the last quarter of 2014 to the third quarter of 2017. Offsh is a dummy taking value one when the deposit location j is an offshore location. PostCRS is a dummy, which equals one in the period after the introduction date of the CRS in the deposit location, the effective date of the CRS in the deposit location or the period of the first wave of information exchange, respectively depending on the CRS specification reported (above the regression results). U.S. is a dummy equal one when the deposit country j is the U.S.. Secrecy is a variable indicating the secrecy ranking of the deposit country j in the Financial Secrecy Index 2018 (constant across all time periods). All regressions include ordered country-pair and residence country-quarter-year fixed effects.

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

by all residence countries in our sample in the offshore countries Guernsey, Hong Kong, Isle of Man, Jersey and Macau, is USD 129 billion. Thus, in our sample the average amount of deposits is decreased by about USD 18 billion upon CRS implementation. Assuming that in all twelve BIS classified offshore countries, for which aggregate data is available, 14% is the reduction achieved, back of the envelope calculations allow a lower bound estimate of a reduction of cross-border deposits of USD 45 billion. When evaluating this estimate as the total CRS effect on cross border tax evasion, it has to be considered that in addition to the above given reasons, further reasons apply that make our estimate of USD 45 billion a lower bound estimate. First, our calculation is based on the twelve BIS classified offshore countries for which aggregate date is available i.e. we do not have data for all BIS classified offshores and we only consider the reductions achieved in cross border deposits held from residence countries in our sample.[28] Second, we are only analyzing deposits located in banks, while the CRS affects a wider range of financial institutions, including for example investment entities and specified insurance companies.[29] Last, to the extent that the reduction observed is due to declaration of income rather than relocation, tax evaders do not necessarily need to repatriate all income held in offshores to make a declaration, just the amount needed to pay back taxes and fines (Hakelberg and Schaub (2018), p. 356). These limitations imply, that a much larger total effect of the CRS on cross-border tax evasion can be expected based on our findings.

Along with the country-specific CRS introduction dates, we test the country-specific CRS effective dates. The result of the test is reported in Column 2 of Table 4. The results are statistically significant and the effect size is even larger suggesting that the reaction increased upon CRS effec-

[28]For our calculations, we assume that the five offshores make up 40% of total offshores deposits. This estimate is based on aggregate data from 2017 provided by BIS.

When evaluating the overall effect of the CRS on cross-border deposits held in offshores the following should be considered. The size of the effect we calculate above represents a lower bound of the overall CRS effect for two key reasons. First, we get access to data on bilateral cross-border deposits located in a representative but limited subsample of five offshore countries. Second, three out of five offshore countries we consider, were already affected by the EU Savings Directive. Meaning that Guernsey, Isle of Man and Jersey already automatically exchanged information on interest income held by EU individual residents in local banks and EU residents represent the majority of the account owners in our sample.

[29]For a complete list, see OECD (2018c), p. 61.

tiveness. After effectiveness of the CRS in the deposit countries, cross-border deposits are on average 15% lower in the offshore countries as compared to non-offshore countries. In Column 3 of Table 4, as an alternative specification of the post CRS period and robustness check, we estimate equation 2, where we chose a post period dummy (PostCRSFirstWave) that is defined as the period after the first wave adopters implemented the CRS. It is constant across all observations and not directly related to country-specific CRS implementation. Using this second, alternative measure, we find that in the post treatment period deposits held in offshore countries are on average 23.1% below those held in the control group countries (see Column 3 of Table 4). The effect is highly significant. This robustness check suggests an economically even larger magnitude. Back of the envelope calculations reveal that deposits in the five considered offshore countries decrease on average by USD 30 billion after CRS effectiveness in the first wave adopter countries and about USD 74 billion when extrapolated to all twelve BIS classified offshore countries for which aggregate data is available.

We report the results from our test of whether the introduction of the CRS leads to a relocation of deposits to the U.S (the estimation of equation 2) in Columns 4 to 5 of Table 4. Column 4 reports regressions results, from running the difference in difference regression without further controls beyond the fixed effects structure. Our test shows that relative to all other countries in our sample and after controlling for the effect of the CRS on offshore deposits, deposits by EU and OECD residents in the U.S. significantly increase, on average by 9%, after CRS effectiveness in the first wave adopters. The effect size is substantial and therefore economically highly relevant. In a given year, the average amount of deposits held by all residence countries in our sample in the U.S. is USD 551 billion. Given our coefficient estimates, that amount is increased by USD 50 billion upon CRS implementation, which is large enough to assume that a substantial part of cross-border deposits, that after CRS effectiveness were removed from offshore countries (our estimate is USD 74 billion), are relocated to the U.S..

To investigate more closely the mechanism through which the threat of the CRS works on relocation of hidden wealth and related income to the U.S., we conduct a further test. We add an interaction of the secrecy score number with the post treatment dummy to control for the secrecy of the deposit country. This is a test to rule out that, rather than the lack of commitment by the U.S. to the CRS, other forms of financial secrecy are the main reason for cross-border deposits being reallocated there. If this were the case,

jurisdictions offering comparable financial secrecy (measured by the secrecy score) to the U.S. would be equally interesting for deposit relocation purposes after CRS implementation, despite their commitment to CRS, and we would expect that the share of deposits relocated to a country should vary with its level of financial secrecy. The corresponding results are reported in Table 4 Column 5. The coefficient on the interaction of the secrecy score number with the post treatment dummy does not load and the observed increase in the U.S. is almost unchanged. This finding suggests that what is making currently the U.S. particularly attractive to cross-border deposits is its non-participation in the CRS, rather than being a secretive country. If the secrecy of the U.S. was the driver of the effect, rather than its non-participation in the CRS, we would expect that the overall most secretive locations also attract the most deposits in response to CRS implementation and therefore, the coefficient on the financial secrecy variable would be positive and significant.

In Appendix A, we re-run the main tests for offshore countries as well as for the U.S. but using this time a balanced sample. In this way, we lose around 9% of the observations. Yet, results are fully in line with the above presented ones.

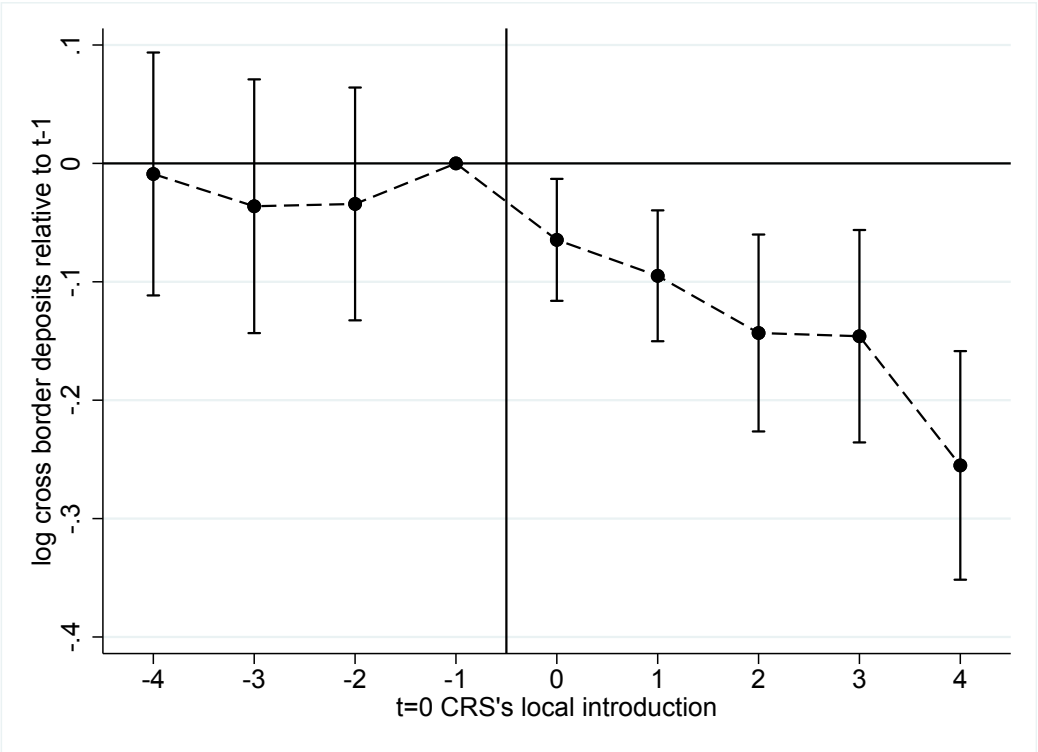
5.2. Robustness Checks

5.2.1. Event Study

In this section, we report graphical results from event-study regressions. Event studies can be used to evaluate the common trends assumption and to assess how quickly the reaction to the CRS emerges, and thus to gain a more comprehensive picture of how the CRS affects tax evasion through the use of cross-border deposits.

To do so, we estimate a version of equation 1 (the test of the CRS's effect on cross-border deposits held in offshore countries), in which we replace the single coefficient of the interaction of the CRS post period and the offshore indicator with 8 separate indicator variables, each marking one quarter over the t-4 to t+4 period relative to the quarter before the CRS treatment event date (t=0). We omit the indicator for period t-1. It therefore serves as benchmark. The treatment indicators are binned at the end points. That is they indicate if treatment at time t-4 happened or more periods ago and if treatment in time t+4 happened or more periods in the future. Figure 3 plots the coefficients for each relative quarter together with the 95% confidence interval. We use the log of cross-border deposits as the dependent variable, and ordered country-pair fixed effects.

Figure 3: Event Study Test of Reaction to CRS Implementation in Offshore Countries

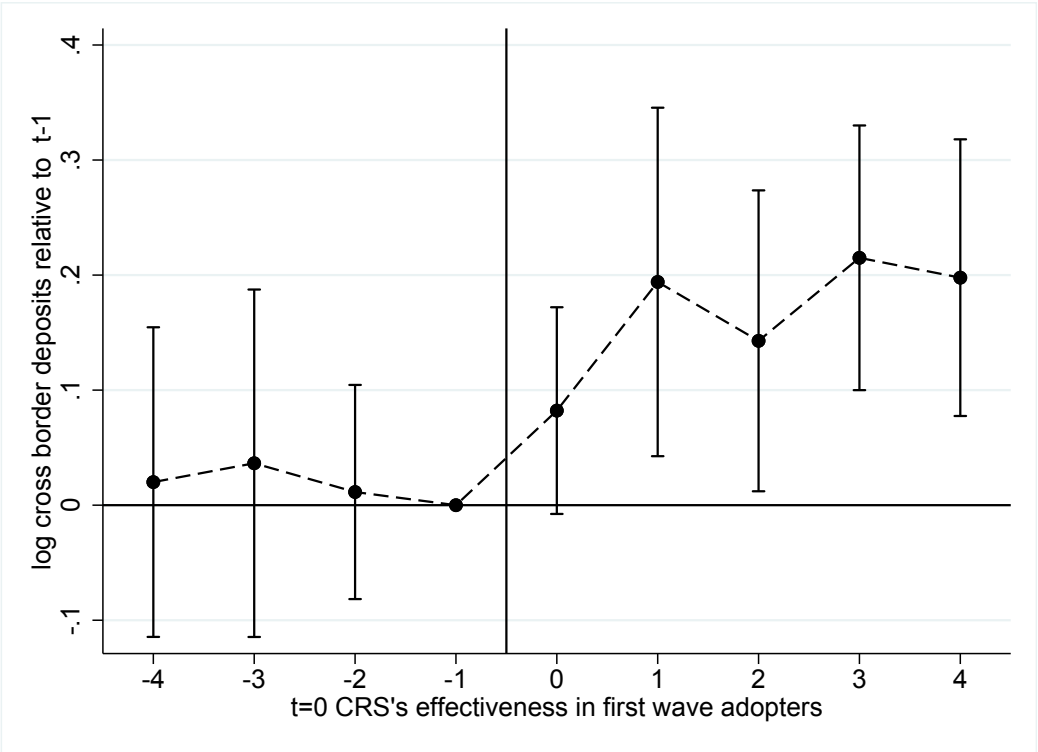


Notes: The figure charts coefficient estimates of cross-border deposits held by residents of EU and OECD countries in offshores around the CRS event dates (in event time). We estimate Eq. 1 (upper panel) but replace the single coefficient of the interaction of CRS introduction and the offshores indicator with 8 separate indicator variables, each marking one quarter over the t-4 to t+4 period relative to the quarter before the CRS event date (0). The treatment indicators are binned at the end points. We omit the indicator for period t-1. It therefore serves as benchmark, and has a coefficient value of zero (and no confidence interval). The figure plots the coefficient estimates of the 8 quarters together with their 95% confidence intervals for the staggered CRS event date at introduction of CRS in the deposit country. We use the log of cross-border deposits as the dependent variable, and ordered country-pair fixed effects.

The effect size increases in absolute magnitude over time and remains significant through quarter t+4. The increase in the effect size suggests that some tax evaders wait until information collection under the CRS commences on CRS effectiveness, before moving their deposits from offshores. This is in line with our baseline analysis showing the effect on offshores deposits on CRS effectiveness dates to be larger than on CRS introduction. The parallel trends assumption is corroborated, since in the pretreatment period the coefficients lie close to zero and are statistically insignificant.

We furthermore conduct an event study of our test of cross-border de-

Figure 4: Event Study Test of Relocation Behavior upon CRS Implementation



Notes: The figure charts coefficient estimates of cross-border deposits held by residents of EU and OECD countries in the U.S. around the CRS event dates (in event time). We estimate Eq. 2 but replace the single coefficient of the interaction of CRS effectiveness in the first wave adopters and the U.S. indicator with 8 separate indicator variables, each marking one quarter over the t-4 to t+4 period relative to the quarter before the CRS treatment event date (0). The treatment indicators are binned at the end points. We omit the indicator for period t-1. It therefore serves as benchmark, and has a coefficient value of zero (and no confidence interval). The figure plots the coefficient estimates of the 8 quarters together with their 95% confidence intervals for the non-staggered CRS event date at effectiveness of CRS in the first wave adopters. We use the log of cross-border deposits as the dependent variable, and ordered country-pair fixed effects.

posits relocation to the U.S.. To do so, we estimate a version of equation 2, in which we replace the single coefficient of the interaction of the CRS first wave adoption indicator with the U.S. indicator, with 8 separate indicator variables, each marking one quarter over the t-4 to t+4 period relative to the quarter before the treatment event date (t=0). Again, we omit the indicator for period t-1, such that it serves as benchmark and bin the treatment indicators at the end points. We use the log of cross-border deposits as the dependent variable, and ordered country-pair fixed effects. Figure 4 plots the coefficients for each relative quarter together with the 95% confidence inter-

val. It shows the change in cross-border deposits in the U.S. relative to the last period before CRS was effective in the first wave adopters. The increase in cross-border deposits in the U.S. is fairly immediate as the coefficient size increases sharply and is almost significant in t=0. It becomes significant starting with the first quarter after CRS effectiveness in the first wave adopters (t=1). The effect size remains significant through quarter t+4. The coefficients in the pre-period (t-1 to t-4) are statistically indistinguishable from the benchmark quarter, showing that there is no pre-trend.

5.2.2. Test Excluding EU Savings Directive Affected Residence Countries

In our baseline model, the sample of residence countries includes mainly EU member states. However, since 2003 and up to the introduction of the CRS, EU residents were subject to the Savings Directive. This means that on private savings income EU member states and Guernsey, Isle of Man and Jersey already automatically exchanged information prior to the CRS. In order to net out the effect of the Savings Directive, we re-run our baseline model including as residence countries only OECD member states, which are not EU member states, namely Australia, Canada, Chile, Israel, Iceland, Japan, South Korea, Mexico, New Zealand, Norway, Switzerland, Turkey and the U.S.. Results are displayed in Table 5. We observe a highly significant 26% reduction of cross-border deposits held by residents of the non-EU OECD member states in offshore countries upon the introduction of the CRS as compared to the change in cross-border deposits in the control countries (see Column 1 in Table 5). As expected, this finding shows that, while the overall effect of the CRS introduction (our preferred specification) on the use of offshores is 14%, the reduction in those countries unaffected by the Savings Directive is even larger. A similar effect is detected when considering the country-specific effective dates (see Column 2 in Table 5). In Column 3 of Table 5, we consider the period after the first CRS adoption wave not measured at the country level and we find that in the post treatment period deposits held in offshore countries are on average 29% below those held in the control group countries. The effect is highly significant.

TABLE 5: NON EU RESIDENTS' CHANGE IN CROSS-BORDER DEPOSITS UPON CRS INTRODUCTION & EFFECTIVENESS

CRS SPECIFICATION	(1) Country Introduction	(2) Country Effectiveness	(3) First Adoption Wave
VARIABLES	LogDeposits	LogDeposits	LogDeposits
PostCRS * Offsh	-0.255***	-0.256***	-0.293**
	(0.0632)	(0.0652)	(0.116)
Observations	3,659	3,659	3,805
R-squared	0.973	0.974	0.969
Country-Pair FE	YES	YES	YES
Residence-Quarter-Year FE	YES	YES	YES
Macao in Sample	NO	NO	YES
Number of Countrypairs	320	320	333

Notes: Cluster robust standard errors in parentheses, clustered at the ordered country-pair level. The dependent variable is the log of cross-border deposits held by residents of country i in banks of deposit location j in the end of quarter q. The unit of observation is the residence and deposits ordered country-pair and the sample period goes from the last quarter of 2014 to the third quarter of 2017. Residence countries are Australia, Canada, Chile, Israel, Iceland, Japan, South Korea, Mexico, New Zealand, Norway, Switzerland, Turkey and the U.S. Offsh is a dummy taking value one when the deposit location j is an offshore location. PostCRS is an indicator variable, in Column 1 for the period after the implementation date of the CRS in the deposit location, in Column 2 for the effective date of the CRS in the deposit location and in Columns 3 for the period of the first wave of information exchange, respectively depending on the CRS specification as reported above the regression results in the table. All regressions include ordered country-pair and residence country-quarter-year fixed effects.

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

5.2.3. Sample Split Test of Relocation to the U.S.

To corroborate the robustness of our finding that the U.S. receives an increasing amount of cross-border deposits upon CRS implementation, we conduct a split sample analysis. We test relocation behavior to the U.S. only on the subsample of country-pairs where the deposit country is the U.S., i.e. from our sample we drop all other observations for which deposits are held in non-U.S. deposit countries. The difference-in-difference regression design thus becomes a time trend test of deposits located in the U.S., where we compare the change in deposits located within the U.S. after CRS effectiveness to before CRS effectiveness. This test rules out that our main findings are driven by changes in the control group rather than in the treated group. As placebo test we investigate the reaction to CRS effectiveness in non-offshore to non-

offshore deposits.[30] We add ordered country-pair fixed effects in both, the main test and the placebo test. We control for common shocks to the economy by quarter-year fixed effects. Results are displayed in Table 6.

TABLE 6: SPLIT SAMPLE TEST, REACTION TO CRS ON DEPOSITS IN U.S. VS. DEPOSITS IN NON-OFFSHORES

	(1)	(2)
	Deposits in U.S.	Deposits in Non-Offshores & Non-U.S.
VARIABLES	LogDeposits	LogDeposits
PostCRS	0.185**	-0.00823
	(0.0876)	(0.270)
Observations	480	8,784
R-squared	0.989	0.972
Country-Pair FE	YES	YES
Residence-Quarter-Year FE	NO	YES
Quarter-Year FE	YES	NO
Number of Countrypairs	40	786

Notes: Cluster robust standard errors in parentheses, clustered at the ordered country-pair level. The dependent variable is the log of cross-border deposits held by residences of country i in banks of deposit country j in the end of quarter q. The unit of observation is the residence-deposits ordered country-pair and the sample period goes from the last quarter of 2014 to the third quarter of 2017. PostCRS is a dummy equal one starting in the period of the first wave of information exchange.
Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The estimated effect of the CRS on the U.S. deposits reported in Table 6 Column 1 is directionally the same as in our main test and highly significant corroborating our difference-in-difference results for the test of relocation behavior to the U.S.. In Column 2 of Table 6, the placebo test underscores that, as we expect, no statistically significant change in non-offshore to non-offshore deposits occurs after CRS effectiveness.

5.2.4. Test of Alternative Attractive Countries for Relocation

To further rule out that other non-offshore countries have become attractive places of relocation after CRS introduction in offshore countries, we test what happens in other potentially attractive non-offshore countries after CRS effectiveness. To make results comparable to our test of relocation to

[30]In that placebo test, the U.S. as residence country is excluded, because changes in cross-border deposits from the U.S. upon CRS effectiveness may be driven by the potential increase in the use of U.S. shell companies in the after CRS era. We test for these changes in deposits from the U.S. to non-offshore countries in additional tests in Section 6.1 below.

the U.S., we employ exactly the same research design. As potentially equally attractive secrecy locations, we consider countries listed among the 15 secrecy locations in the Financial Secrecy Index ranking. Next to the U.S., we have data on three of these countries, namely, Switzerland, Luxembourg and the Netherlands.[31] In contrast to the U.S., they all implemented the CRS.

TABLE 7: THE U.S. VS. ALTERNATIVE RELOCATION COUNTRIES

	(1)	(2)	(3)	(4)
VARIABLES	LogDeposits	LogDeposits	LogDeposits	LogDeposits
PostCRS * Offsh	-0.226***	-0.236***	-0.232***	-0.237***
	(0.0601)	(0.0601)	(0.0600)	(0.0598)
PostCRS * US	0.0902*			
	(0.0479)			
PostCRS * CH		-0.103*		
		(0.0529)		
PostCRS * LU			-0.0131	
			(0.0616)	
PostCRS * NL				-0.185**
				(0.0787)
Observations	11,884	11,884	11,884	11,884
R-squared	0.972	0.972	0.972	0.972
Country-Pair FE	YES	YES	YES	YES
Residence-Quarter-Year FE	YES	YES	YES	YES
Number of Countrypairs	1051	1051	1051	1051

Notes: Notes: Cluster robust standard errors in parentheses, clustered at the ordered country-pair level. The dependent variable is the log of cross-border deposits held by residences of country i in banks of deposit country j in the end of quarter q. The unit of observation is the residence-deposits ordered country-pair and the sample period goes from the last quarter of 2014 to the third quarter of 2017. Offsh is a dummy taking value one when the deposit country j is an offshore country. PostCRS is a dummy equal one starting in the period of the first wave of information exchange. US, CH, LU, NL is a dummy equal one when the deposit country j is the US, CH, LU, NL. All regressions include ordered country-pair and residence-quarter-year fixed effects.

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

As expected, in none of these alternative countries we observe an increase in cross-border deposits (see Table 7). Cross-border deposits held in

[31] Additional countries for which we would have data and are included in the top 15 FSI ranking includes Hong Kong and Guernsey. We exclude those countries from our test because we consider them in our main tests.

Luxembourg remain unchanged, whereas in the Netherlands and Switzerland cross-border deposits even decrease relative to those in non-offshores upon CRS introduction. Of all non-offshores high secrecy locations in our sample, the U.S. is therefore the only one for which we observe an increase in cross-border deposits after CRS effectiveness as compared to the other non-offshore countries. These findings confirm that the attractiveness of the U.S. as location for cross-border tax evasion lies in its non-compliance to the CRS. While those jurisdictions that introduced the CRS despite offering high bank secrecy become on average less attractive.

5.2.5. Placebo Test on the Role of CRS Introduction in Residence Countries

We expect that the reaction to CRS implementation occurs at the moment when the CRS is implemented in the deposit country rather than upon implementation in the residence location. To test this claim we run the following regression:

$$\begin{aligned} log(Deposits_{ijt}) = \alpha &+ \beta_1 PostCRSResL_{it} \\ &+ \beta_2 PostCRSResL_{it} * Offsh_j \\ &+ \beta_3 PostCRSDepL_{jt} \\ &+ \beta_4 PostCRSDepL_{jt} * Offsh_j \\ &+ \gamma_{it} + \delta_{ij} + \epsilon_{ijt} \end{aligned} \tag{4}$$

Where the dependent variable $log(Deposits_{ijt})$ stands for (log) volume of deposits of residents of country i in banks at deposit country j at the end of quarter t. $Offsh_j$ is the treatment dummy taking value one when the deposit country is an offshore country.[32] $PostCRSResL_{it}$ and $PostCRSDepL_{jt}$ are the two post treatment period dummies, we are interested in comparing. They switch on after CRS implementation and stay switched on until the end of the sample period. $PostCRSResL_{it}$ denotes the implementation date of the CRS in the residence country and $PostCRSDepL_{jt}$ denotes implementation of the CRS in the deposit country. We add quarter-year and ordered country-pair fixed effects. Standard errors are cluster-robust, with clustering

[32]Since the treatment dummy is perfectly multicollinear with our country-pair fixed effects we do not include it as non-interacted term.

on the ordered country-pair level. The regression design follows closely our baseline identification strategy, except for the fixed effects structure that had to be adapted to allow us testing of the effect of the CRS implementation in the residence country. Coefficient β_2 captures the effect of the CRS implementation in the residence country on offshore deposits and coefficient β_4 captures the effect of the CRS implementation in the deposits country on offshore deposits. We expect β_2 to be insignificant and β_4 to be negative and significant. This is what we find in Table 8. The findings corroborate that the reaction to CRS implementation occurs at the moment when the CRS is implemented in the deposit country rather than upon implementation in the residence country.

TABLE 8: CHANGE IN CROSS-BORDER DEPOSITS
IN OFFSHORES UPON CRS INTRODUCTION IN RESIDENCE VS DEPOSIT COUNTRY

	(1)
CRS SPECIFICATION	Country Introduction
VARIABLES	LogDeposits
PostCRSDepL * Offsh	-0.118***
	(0.0413)
PostCRSResL * Offsh	-0.0297
	(0.0581)
Observations	11,472
R-squared	0.972
Country-Pair FE	YES
Quarter-Year FE	YES
Number of Countrypairs	1012

Notes: Cluster robust standard errors in parentheses, clustered at the ordered country-pair level. The dependent variable is the log of cross-border deposits held by residents of country i in banks of deposit country j in the end of quarter q. The unit of observation is the residence-deposits ordered country-pair and the sample period goes from the last quarter of 2014 to the third quarter of 2017. Offsh is a dummy taking value one when the deposit country j is an offshore country. PostCRSResL is a dummy, which equals one in the period after the implementation date of the CRS in the residence country and equally PostCRSDepL denotes implementation of CRS in the deposit country. All regressions include ordered country-pair and quarter-year fixed effects.

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

6. Additional Tests

6.1. Test of the Use of Shell Companies in the Post-CRS Era

So far, we only address tax evaders who hold offshore bank accounts in their own name, i.e. directly. Instead of directly holding an offshore bank

account, tax evaders can first set up a company in an offshore country and through that company (a so-called shell company) they then hold an offshore bank account. Shell companies are used to add layers of secrecy between the hidden account and its beneficial owner. There is vast anecdotal and empirical evidence on offshore bank accounts being held by individuals indirectly through shell companies such as the evidence reported in the context of the paradise and panama papers. We proceed by investigating how CRS affects the use of shell companies by tax evaders.

To detect shell companies, we follow the identification strategy proposed in Johannesen and Zucman (2014). Their identification strategy relies on the fact that cross-border deposits from the BIS include deposits owned by both entities and individuals. This enables us to exploit the same measure of tax evasion as in our previous specifications. For example, when an Italian tax evader holds assets in Jersey through a shell company in Hong Kong, the BIS assigns the funds to Hong Kong, i.e. we observe in our data these deposits as being held by a Hong Kong resident in Jersey. As Johannesen and Zucman (2014), we first study the reaction by tax evaders to the CRS by testing for decreases in deposits held by residents of offshore countries in other offshore countries. In the second test on the CRSs effect on relocation of deposits held by shell companies, we test for increases in deposits held by offshore residents in the U.S.. For the purpose of these analyses, we are able to extend our sample to 18 offshore resident countries. This is due to the availability of bilateral data at BIS on deposits held by residents of Aruba, Bahamas, Bahrain, Barbados, Bermuda, Cayman Islands, Curacao, Gibraltar, Guernsey, Hong Kong, Isle of Man, Jersey, Lebanon, Macau, Mauritius, Panama, Samoa and Singapore in Guernsey, Hong Kong, Isle of Man, Jersey, Macau.[33]

We test first whether the introduction of the CRS has led to a reduction of shell companies holding cross-border deposits in other offshore countries. For that purpose, the sample is restricted to deposits held by offshore residents (i.e. our proxy for cross-border deposits held through shell companies) in other offshore countries. We regress these offshore-to-offshore deposits on the post-CRS dummy. The regression takes the following form:

[33]We select all countries listed as offshores at the BIS.

$$log(Deposits_{off,off,t}) = \alpha + \beta_1 PostCRSFirstWave_t + \gamma_t + \theta_{off,off} + \epsilon_{off,off,t} \quad (5)$$

All variables are defined as above. Following Johannesen and Zucman (2014), we add ordered country-pair and quarter-year fixed effects as well as cluster robust standard errors at the ordered country-pair level. β_1 is the coefficient of interest.

Ex ante, the direction of the effect is unclear. Anecdotal evidence suggests that the CRS could be circumvented by the setting up of shell companies in certain circumstances. According to the CRS guidelines, financial institutions are required to identify the controlling person(s) in case the account holder is an entity. However, it might not always be feasible to obtain information on the final beneficial owner. Thus, holding a financial account through shell companies located in a traditional offshore country may still represent a valuable strategy to hide wealth and related income outside the country of residence. In case individuals avoid CRS reporting requirements by the use of shell companies in offshore countries, we would expect a coefficient, which is insignificant or even positively significantly different from zero. If instead, the CRS is effective in addressing tax evasion by the use of shell companies in offshore countries, we would expect a negatively significant coefficient. Indeed, this is what we find. Offshore deposits in offshore-to-offshore constellations decreased by 36% in our sample after the CRS is effective in the first wave CRS adopters, which indicates that the overall use of offshore shell companies in this constellation decreased as reaction to the CRS (see Table 9 Column 1). This is equivalent to a USD 24 billion reduction in our sample. If we extrapolate to all 12 offshores for which aggregate deposits are available it becomes USD 60 billion.

Secondly, we test whether offshore shell companies increased their deposits in the U.S. after the CRS introduction. We expect that the CRS leads to an increase of offshore shell companies holding bank accounts in the U.S.. We restrict the sample to offshore residence countries and the U.S. as deposit country. We then regress these offshore-to-U.S. deposits on the post CRS dummy. The regression takes the form:

$$log(Deposits_{off,US,t}) = \alpha + \beta_1 PostCRSFirstWave_t + \gamma_t + \theta_{off,US} + \epsilon_{off,US,t} \quad (6)$$

All variables are defined as above. β_1 is the coefficient of interest, which we expect to be positive and significantly different from zero. For the purpose of this test, we cannot use residence-quarter-year fixed effects given that we only consider one deposit location. We find an increase of 47% of deposits held in the U.S. by offshore residents after the CRS is effective in the first wave CRS adopters (see Table 9 Column 2). Based on average deposits held through the 16 offshore countries in our sample in the US, this effect is equivalent to an increase of USD 121 billion.

Lastly, we test for the raising relevance of the U.S. as location for shell companies. As Sharman (2010) and Findley et al. (2015) show, not only traditional offshore countries, but also the U.S. offer very attractive conditions for setting up shell companies. Thus, we can expect that upon the introduction of the CRS, given the compliance of all traditional offshore countries, tax evaders may now find it more appealing to also set up their shell companies in the U.S.. Furthermore, through those entities they may hold local as well as international deposits in non-offshore countries, since wealthy individuals may both be unwilling to accumulate all their capital in one single country and present a home-bias investment attitude (Coeurdacier and Rey (2012)). Therefore, one can presume tax evaders to own also deposits located outside the U.S. indirectly via U.S. shell companies. This would represent a similar round-tripping strategy as the one detected by Hanlon et al. (2015) in the context of U.S. tax-payers.

For example, a German taxpayer could set up an investment entity in the U.S. and through that entity hold deposits in a Swiss bank. The CRS requirements force financial institutions to inspect the entity to identify the final beneficial owner if the entity is located in a non-CRS participating jurisdiction. Thus, as the U.S. is not CRS compliant, one should suppose that the German taxpayer would see his indirectly owned bank account reported to the German tax authority. However, certain countries such as Luxembourg or Switzerland do consider the U.S. as a CRS participating jurisdiction given the existence of FATCA.[34] This implies that Switzerland, for example, would not investigate the beneficial owner of the U.S. entity. The German taxpayer could exploit the above-described loophole to circumnavigate the CRS requirements and avoid any tax obligation in his country of residence. We test this second channel for tax evasion via U.S. shell companies by comparing

[34]For more information, see KPMG (2016) or Tax Justice Network (2016)

the change in cross-border deposits held by U.S. residents in non-offshore countries before and after the implementation of the CRS. Thus, we regress these U.S.-to-non-offshores deposits on the post CRS dummy. The regression takes the form:

$$\begin{aligned} log(Deposits_{US,Non-Off,t}) = \alpha + \beta_1 PostCRSFirstWave_t \\ + \gamma_t + \theta_{US,Non-Off} + \epsilon_{US,Non-Off,t} \end{aligned} \tag{7}$$

All variables are defined as above. We add ordered country-pair and quarter-year fixed effects as well as cluster robust standard errors at the ordered country-pair level. Results suggest an increase of 31% of deposits held by U.S. residents in non-offshore countries after the CRS is effective in the first wave CRS adopters (see Table 9 Column 3). Based on average deposits held by US residents in the non-offshore countries in our sample this is equivalent to a USD 254 billion increase. This finding gives first evidence, that after the CRS implementation also the use of U.S. shell companies could have substantially increased and may so confirm the relevance of the U.S. for tax evasion purposes of non-U.S. residents following the CRS.

TABLE 9: CHANGE IN CROSS-BORDER DEPOSITS
HELD BY SHELL COMPANIES UPON CRS EFFECTIVENESS

	(1)	(2)	(3)
SAMPLE	Offshore to Offshore	Offshore to US	US to Non-Offshore
VARIABLES	LogDeposits	LogDeposits	LogDeposits
PostCRS	-0.357***	0.468**	0.311**
	(0.114)	(0.172)	(0.146)
Observations	1,037	208	246
R-squared	0.956	0.987	0.964
Country-Pair FE	YES	YES	YES
Quarter-Year FE	YES	YES	YES
Number of Countrypairs	82	16	22

Notes: Cluster robust standard errors in parentheses, clustered at the ordered country-pair level. The dependent variable is the log of deposits held by residents of country i in banks of deposit country j in the end of quarter q. The unit of observation is the residence country deposit country pair and the sample period goes from the last quarter of 2014 to the third quarter of 2017. In Column 1, the sample is restricted to the 18 offshores as residence country and the U.S. as deposit country. In Column 3, the sample is restricted to U.S. as residence country and non-offshores as deposit country. Offsh is a dummy taking value one when the deposit country j is an offshore country. PostCRS is a dummy equal one starting in the period of the first wave of information exchange. All regressions include ordered country-pair and quarter-year fixed effects.

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

6.2. Conclusion

In this study, we analyze the impact of the CRS, an unprecedented standard for the automatic exchange of information, on cross-border tax evasion. We document a statistically significant decrease ranging from 14% to 36% of cross-border deposits in major offshore countries around the world upon the local implementation of the CRS. Moreover, we do not find that the CRS truly puts an end to cross-border tax evasion, but we rather document an unexpected change in the dynamics of cross-border tax evasion.

We add to the prior literature by providing first evidence that an unexpected country seems to attract wealth and related income for the purpose of tax evasion, i.e. the U.S.. The U.S. represent the only major economy that so far did not commit to the CRS. In this analysis, we show that cross-border deposits in the U.S. increase upon CRS implementation between 9% to 47%. We are aware of the threat of confounding factors. To reduce this threat as far as possible, we carefully draft our empirical analyses first by employing a

well-established empirical model for estimation of cross-border tax evasion. Second, we implement a demanding fixed effects structure going beyond that used in much of prior research. Third, we limit our analysis to a narrow period of time (2014-2017) to avoid that other major events - e.g. FATCA or the U.S. 2018 tax reform - may influence our outcomes. Last, we test the robustness of our results in event studies and sample splits.

We believe that our study contributes substantially to the current international debate on cross-border tax evasion. A main finding is that the CRS leads to a reduction of offshore deposits of USD 74 billion at the lower bound. Thus, we trust that the direct and indirect costs faced by participating jurisdictions to be CRS compliant are justified by the encouraging effect the global standard for AEOI seems to have. However, our findings also suggest that the U.S. should reconsider its current position on the AEOI on foreign deposits held within its borders. This would remove one major loophole in the CRS and therefore strongly support the fight against cross-border tax evasion.

Finally, given the now extensive network of exchange relations, in the future tax evaders are expected to focus more on cross-product tax evasion and less on cross-border tax evasion. Thus, we suggest for future research to investigate newly available channels to avoid tax obligations, for example crypto currency.

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Appendix A. Test on a Balanced Sample

In order to preserve the maximum number of observations possible, in our main analysis we use an unbalanced sample. In a robustness check, we re-run our main regression analysis using a balanced sample. This leads to the loss of around 9% of the observations. In Table 1a we show that results are essentially unchanged. Cross-border deposits of OECD and EU residents in offshore countries experience a 14.3% reduction after CRS introduction and a 22.7% reduction after the CRS became effective in the first wave adopters if compared to the change in cross-border deposits in the non-offshore deposit

countries (see Column 1 and 2 Table 1a). Relative to all other non-offshore deposit countries in our sample an increase of 8.1% in deposits in the U.S. held by EU and OECD residents is detected after CRS effectiveness in the first wave adopters (see Column 2 of Table 1a). Thus, we can rule out that our tests suffer from selection bias due to unbalanced sampling.

TABLE 1A: BALANCED SAMPLE CHANGE IN CROSS-BORDER DEPOSITS AND RELOCATION TO THE U.S. IN THE AFTER CRS PERIOD

	(1)	(2)	(3)
CRS SPECIFICATION	Country Introduction	First Adoption Wave	First Adoption Wave
VARIABLES	LogDeposits	LogDeposits	LogDeposits
PostCRS * Offsh	-0.143***	-0.227***	-0.222***
	(0.0495)	(0.0567)	(0.0571)
PostCRS * US			0.0806*
			(0.0483)
Observations	10,968	10,968	10,968
R-squared	0.973	0.973	0.973
Country-Pair FE	YES	YES	YES
Residence-Quarter-Year FE	YES	YES	YES
Number of Countrypairs	914	914	914

Notes: Cluster robust standard errors in parentheses, clustered at the ordered country-pair level. The dependent variable is the log of cross-border deposits held by residences of country i in banks of deposit country j in the end of quarter q. The unit of observation is the residence-deposits ordered country-pair and the sample period goes from the last quarter of 2014 to the third quarter of 2017. Offsh is a dummy taking value one when the deposit country j is an offshore country. PostCRS is an indicator variable, in Column 1 for the period after the introduction date of the CRS in the deposit location, in Column 2 and 3 for the period of the first wave of information exchange, respectively depending on the CRS specification as reported above the regression results in the table. US is a dummy equal one when the deposit country j is the US. All regressions include ordered country-pair and residence-quarter-year fixed effects.

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Appendix B. Test of Alternative List of Offshore Countries

TABLE 1B: ALTERNATIVE OFFSHORES SAMPLE
CHANGE IN CROSS-BORDER DEPOSITS IN CRS INTRODUCTION & EFFECTIVENESS

	(1)	(2)	(3)	(4)
CRS SPECIFICATION	Country Introduction	Country Effectiveness	First Adoption Wave	First Adoption Wave
VARIABLES	LogDeposits	LogDeposits	LogDeposits	LogDeposits
PostCRS * Offsh	-0.119***	-0.117***	-0.140***	-0.135***
	(0.0415)	(0.0418)	(0.0394)	(0.0403)
PostCRS * US				0.0832*
				(0.0494)
Observations	11,472	11,472	11,472	11,472
R-squared	0.974	0.974	0.974	0.974
Country-Pair FE	YES	YES	YES	YES
Residence-Quarter-Year FE	YES	YES	YES	YES
Macao in Sample	NO	NO	YES	YES
Number of Countrypairs	1012	1012	1012	1012

Notes: Cluster robust standard errors in parentheses, clustered at the ordered country-pair level. The offshores countries in this alternative sample are the group of countries identified in Johannesen et al. (2018) as tax haven. The dependent variable is the log of cross-border deposits held by residences of country i in banks of deposit country j in the end of quarter q. The unit of observation is the residence-deposits ordered country-pair and the sample period goes from the last quarter of 2014 to the third quarter of 2017. Offsh is a dummy taking value one when the deposit country j is an offshore country. PostCRS is an indicator variable, in Column 1 for the period after the implementation date of the CRS in the deposit location, in Column 2 for the effective date of the CRS in the deposit location and in Columns 3 and 4 for the period of the first wave of information exchange, respectively depending on the CRS specification as reported above the regression results in the table. US, is a dummy equal one when the deposit country j is the US. All regressions include ordered country-pair and residence-quarter-year fixed effects.

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

In our baseline model, we strictly follow the BIS list of offshore countries considering all offshores for which we have access to cross-border deposits at bilateral level, i.e. Guernsey, Isle of Man, Hong Kong, Jersey and Macau. In earlier research on tax evasion also larger countries such as Austria or Switzerland are included in tax haven lists (see e.g. Johannesen and Zucman (2014)). Austria for example may be considered as a tax haven, because it offers a tax attractive environment to firms financing companies.[35] However, in this paper we are interested in other kinds of tax avoidance, namely, by wealthy individuals, rather than by corporations. Thus, we chose the BIS list of offshores, which is made up of small economies. In these small economies the probability that cross-border deposits are held for reasons of individual tax evasion as compared to for reasons of company tax evasion or economic activity are much higher than in larger haven countries. However, the BIS list excludes at least one country whose banks are known to be big payers in

[35]See for example https://media.arbeiterkammer.at/wien/PDF/studien/Studie_tax_avoidance.pdf, pp. 54-55.

the individuals tax evasion industry, Switzerland.

Thus, in order to show that our results are robust to alternative offshore lists, we rerun our main tests on the sample of offshores used in Johannesen et al. (2018). Johannesen et al. (2018) also study individual tax evasion. They define tax havens as the OECD (2000) list of uncooperative tax havens plus Switzerland, Singapore, Hong Kong and Luxembourg. The OECD (2000) list contains only very small countries, of which we have data for Guernsey, Jersey and Isle of Men, which we also include in our list of offshores. Therefore, following Johannesen et al. (2018), we add to our original list of offshores Switzerland and Luxembourg and delete Macau. In Table 1b we run the same regression as in our baseline tests of the CRS effect on offshore countries and in our test of relocation to the U.S. (Table 4), but the sample of offshore countries is based on the alternative haven list provided by Johannesen et al. (2018). Table 1b shows, that while the effect sizes are slightly smaller the significance levels remain unchanged demonstrating the robustness of our effects against alternative lists of offshores.

Appendix C. Reduced Control Group

One concern with our choice of the control group might be that concurrent changes in the depository countries may be driving the observed effects. Two concurrent events may be critical in this regard. First, Switzerland is likely to have experienced a shock to its cross-border deposits following the first quarter of 2015 when the Swiss central bank abandoned the 1.20 francs per euro cap.[36] Second, the Italian banking crisis surfacing again in the last quarter of 2016 is likely to have caused a negative shock on deposits held in Italian bank accounts.[37] To rule out that the effects, which we measure, are influenced by these countries financial turmoil, we rerun our main tests in Table 1c on a reduced sample excluding Switzerland and Italy as deposits countries. The results remain unchanged suggesting that the two events in Switzerland and Italy are not influential on our main outcomes.

[36]See e.g. https://www.reuters.com/article/us-swiss-snb-cap/swiss-central-bank-stuns-market-with-policy-u-turn-idUSKBN0KO0XK20150115, accessed on 18.12.2018

[37]See e.g. https://www.theguardian.com/commentisfree/2016/nov/28/italy-failing-banks-new-japan, accessed on 18.12.2018

TABLE 1C: REDUCED CONTROL GROUP, CHANGE IN CROSS-BORDER DEPOSITS UPON CRS INTRODUCTION & EFFECTIVENESS

	(1)	(2)	(3)	(4)
CRS SPECIFICATION	Country Introduction	Country Effectiveness	First Adoption Wave	First Adoption Wave
VARIABLES	LogDeposits	LogDeposits	LogDeposits	LogDeposits
PostCRS * Offsh	-0.145***	-0.149***	-0.236***	-0.231***
	(0.0515)	(0.0511)	(0.0603)	(0.0609)
PostCRS * US				0.0869*
				(0.0496)
Observations	10,555	10,555	10,967	10,967
R-squared	0.973	0.973	0.971	0.971
Country-Pair FE	YES	YES	YES	YES
Residence-Quarter-Year FE	YES	YES	YES	YES
Number of Countrypairs	935	935	974	974

Notes: Cluster robust standard errors in parentheses, clustered at the ordered country-pair level. The dependent variable is the log of cross-border deposits held by residences of country i in banks of deposit country j in the end of quarter q. The unit of observation is the residence-deposits ordered country-pair and the sample period goes from the last quarter of 2014 to the third quarter of 2017. Offsh is a dummy taking value one when the deposit country j is an offshore country. PostCRS is an indicator variable, in Column 1 for the period after the introduction date of the CRS in the deposit location, in Column 2 for the effective date of the CRS in the deposit location and in Columns 3 and 4 for the period of the first wave of information exchange, respectively depending on the CRS specification as reported above the regression results in the table. US is a dummy equal one when the deposit country j is the US. All regressions include ordered country-pair and residence-quarter-year fixed effects.

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1